



Osteochondral Allograft Femur and Meniscus Transplant

Post-Operative Rehabilitation Protocol

0-6 weeks

- Strict NWB with crutches for 6 weeks
- Knee immobilizer until 6 weeks
- CPM 0-90
- Patellar mobilization
- SLR supine while in immobilizer
- Quad Sets while in immobilizer
- Ankle Pumps
- From 2 weeks on: Side lying hip and core, advance quad set and stretching

6-8 weeks

- Begin WBAT progression starting at 6 weeks: advance to PWB (25% then 50%) then continue to progress until full WBAT
- Progress to Full WB by 8 weeks post op
- Discontinue crutches once gait is normalized and non-antalgic
- Discontinue immobilizer once good quad control
- Begin Active ROM as tolerated (Caution over 90° to protect posterior horn)
- Heel raises, total gym (closed chain), gait normalization, eccentric quads, eccentric hamstrings.
- Advance core, glutes, and pelvic stability

8-12 weeks

- Full Pain free ROM
- Progress closed chain activities
- Advance hamstring work, lunges/leg press 0-90 only, proprioception/balance exercises.
- Begin stationary bike

>12 weeks

- Progress phase III and functional activities
- Walking lunges, planks, bridges, swiss ball, half bosu exercises.
- Advance core/glutes and balance.

Weight Bearing Status

NWB x 6
weeks

Brace Settings

Knee
Immobilizer
until good
quad control
around 6
weeks

ROM Restrictions

PROM 0-90°
beginning
POD 1



Exercise	Week														
	1	2	3	4	5	6	7	8	9	10	16	20	26	32	
Initial Exercises:															
ROM Goals	0-90°					0-125°			Progress to full						
Flexion/extension, wall slides	[Green bar]														
Flexion/extension- seated	[Green bar]														
Patella/Tendon mobilization	[Green bar]														
Extension mobilization	[Green bar]														
Quad Series	[Green bar]														
Hamstring strength progression	[Green bar]														
Sit and reach for hamstrings (towel)	[Green bar]														
Ankle Pumps	[Green bar]														
Crutch weaning	NWB → PWB by 6 weeks								Full by 8 weeks						
SLR (w/ brace until quad control restored)	[Green bar]														
Toe and Heel Raises	[Green bar]														
Balance Series	[Green bar]														
Weight-bearing Strength Exercises:															
Leg Bridges (2 → 1 leg)	NWB					[Green bar]									
SLS Balance progressions						[Green bar]									
Beginning cord exercises						[Green bar]									
Squat/Leg press (ISO → reps, 2 → 1 leg)						[Green bar]									
Step-up/Lunge Progressions						[Green bar]									
Dead Lift (2 → 1 leg)						[Green bar]									
Cardiovascular Exercises:															
Bike with non-operative leg no resistance	[Green bar]														
Bike with both legs- no resistance progress as tolerated	NWB					[Green bar]									
Aqua jogging						[Green bar]									
Treadmill-walking (no limp)						[Green bar]									
Swimming with fins						[Green bar]									
Elliptical Trainer						[Green bar]									
Stair stepper						[Green bar]									
*Note for Cardio Exercises	Must tolerate daily walking with no limp & no significant increase in pain/swelling prior to initiating WB cardio (walk, elliptical, stepper)														
Agility Exercises:															
Running Progression	NWB					[Green bar]									
Initial-Single Plane						[Green bar]									
Advance-Multi Directional						[Green bar]									
High Level Activities:															
Golf Progression	NWB					[Green bar]									
Outdoor biking, hiking, running						[Green bar]									
Return to Full Sport at 9 months post-op						[Green bar]									

Adapted from post-operative protocol created by Howard Head Physical Therapy, Jill Monson, PT, OCS and Jon Schoenecker, PT, OCS, CSCS



Quad Series:

- Quad sets (5 sec hold) also quick contractions (NMES to supplement)
- Prone quad sets
- SLR with no extension leg
- Progression of Quad Strengthening (WB exercises at 6 weeks)
 - LAQ in safe range -no added resistance to begin
 - Once weight bearing tandem stance TKE with 5 sec hold
 - Isometric wall sit
 - SLR with resistance
 - Step up progression
 - Squat progression
 - Leg press progression
 - Lunge progression

Hamstring Series:

- Hamstring stretching (supine/prone)
- Hamstring set (heel dig)- contract hamstring with knee flexed pressing heel into the floor (5 sec hold)
- Hamstring curls
- Progress to resisted hamstring curl

Sport Test Exercises:

- Goals: impact training and introduction of directional drills
- Double leg squat jumps
- Box jumps
- Speed skaters
- Double leg jumps for height and distance progress to single leg as tolerated
- Blaze pod change of direction drills

Further Clarifications and Considerations

- May begin to implement BFR as early as 1 week into post-op period
- Cord exercises (resistance band/cord): resisted double knee bends, resisted hamstring curls



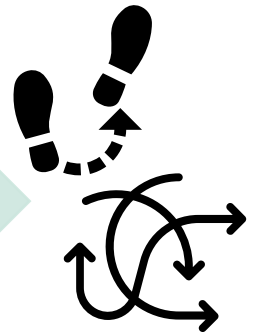
Return to Running Criteria

- Trace effusion, flexion within 5 degrees of contralateral side
- LSI on anterior reach Y balance test $\geq 90\%$
- LSI on quadriceps torque output on isometric measurement $\geq 75\%$
- 12" SL squat tolerance
- Able to walk > 1 mile with no limping or pain
- Able to "hop" with UE assist on operative leg 5 times without pain or compensation
- SL balance with eyes closed 30 seconds without loss of balance



Return to Agility/Change of Direction Criteria

- Return to running criteria listed above met
- No effusion
- Full ROM
- Quad LSI on isokinetic $\geq 85\%$
- Hamstring LSI on isokinetic $\geq 85\%$
- LSI on anterior reach Y-balance $\geq 95\%$
- SL hopping pain-free and effusion free



Return to Sport Criteria

- In order to test must demonstrate full AROM, no pain, no/trace effusion, 5/5 strength, negative lachman and pivot shift, LSI $\geq 95\%$ hamstring curl and leg press
- Quadricep strength $\geq 95\%$ of contralateral side (< 2 cm of atrophy)
- Able to perform single leg squat with correct form
- LSI SL hop $\geq 95\%$
- Y-Balance $\geq 95\%$ (mean of 3 trials in anterior, posterolateral, posteromedial /100)
- Vertical jump test, single leg hop distance, and timed single leg hop over 20 -feet $\geq 90\%$ of contralateral side

